



# Nipple shield use in preterm infants: Results from a national cohort study.

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## Background

- Prevalence and motives for nipple shield use are not well studied in preterm infants and recommendations of nipple shield use in preterm infants are inconsistent.
- Small studies suggest nipple shield use facilitates any breastfeeding.
- Larger studies found more than double risk for not establishing exclusive breastfeeding after a nipple shield is introduced (the present cohort: OR 2.3).



## Aim

- To determine the prevalence of nipple shield use among preterm infants,
- to explore the motives of nipple shield use,
- to elucidate the association between motives for nipple shield use and exclusive breastfeeding in preterm infants.



## Methods

- Part of national cohort study 2009 – 2011.
- Questionnaire answered by 1221 mothers of 1488 infants from 18 NICUs and 3 mixed wards.
- Data on nipple shield use: 1407 infants.



## Setting

- Danish preterm infants were hospitalised until breastfeeding was well established or until exclusive breastfeeding was no longer the goal and mixed feeding or bottle-feeding established.
- Bottle-feeding was in general not introduced to preterm infants when exclusive breastfeeding was still the mother's goal.
- Whether to use a nipple shield or not would mostly be suggested by the staff.

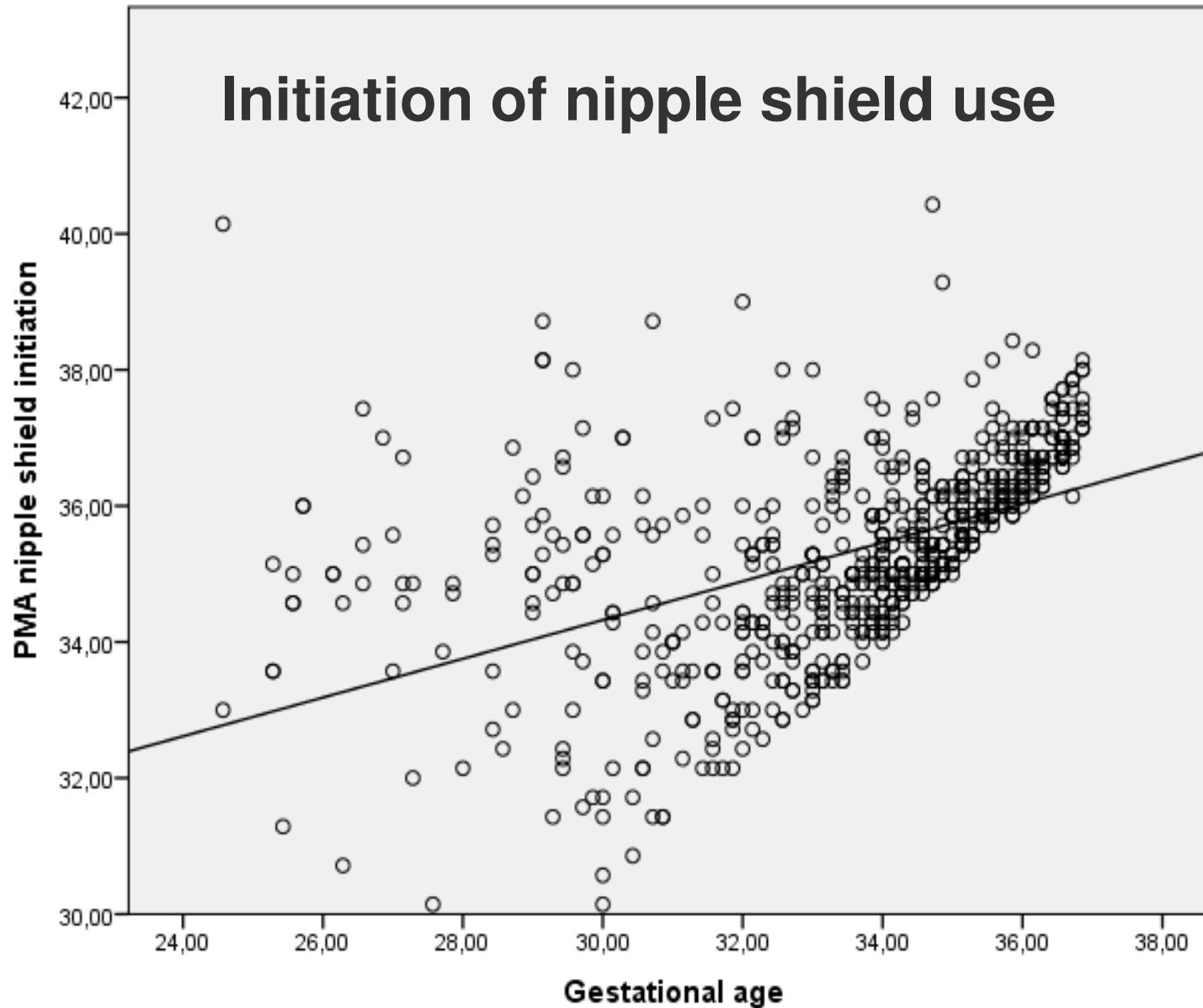
**Table 1. Infant and mother characteristics in nipple shield users and non-users**

Infant characteristics (1407 infants)	Total n/N	%	Not used		Person's Chi-Square
			Used nipple shield (%)	nipple shield (%)	
SGA	253/1393	18	21	15	0.003
<b>Maternal characteristics (1165 mothers)</b>					
Primiparous	732/1153	64	77	47	<0.0001
Maternal age < 30 years	490/1164	42	46	38	0.009
Breastfed excl for at least 4 months	185/1119	17	9	27	<0.0001
Very confident in fulfilling plans of breastfeeding duration	291/1144	25	21	31	0.0003
Breastfeeding is of very great importance to the mother	678/1148	59	54	65	0.0001



## Prevalence and characteristics

- Nipple shields used by 54% of mother-infant dyads.
- Nipple shields were used significantly more by mothers of infants small for gestational age, first-time mothers, mothers younger than 30 years.
- Nipple shields were used significantly less by mothers with high breastfeeding self-efficacy, mothers for whom breastfeeding was of very great importance, smoking mothers, and mothers speaking another language than Scandinavian at home.

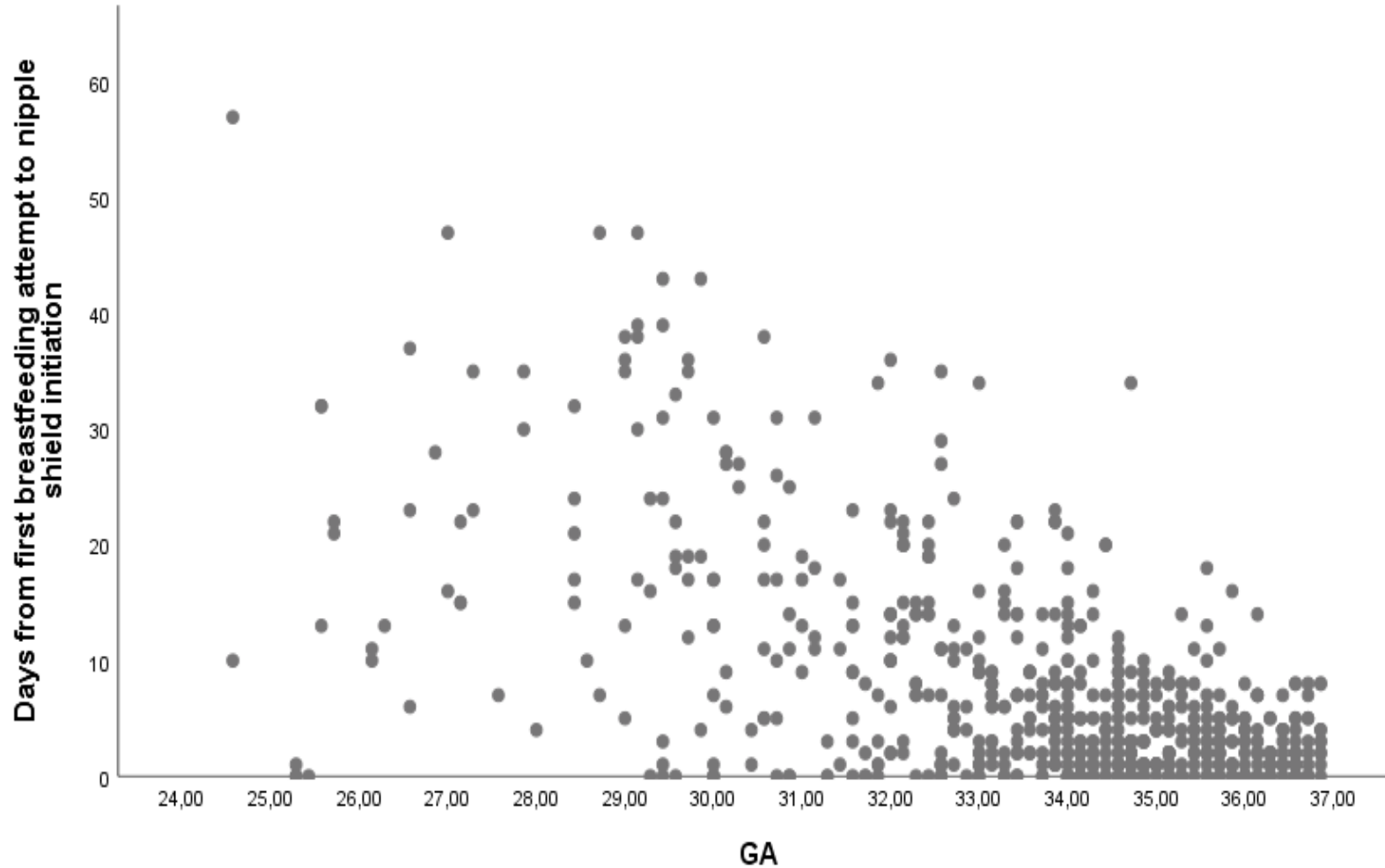


- Correlation GA and PMA at initiation  
( $R^2$  Linear = 0.239,  $p < 0.0001$ )





Simple Scatter of Days from first breastfeeding attempt to nipple shield initiation by GA



- Median 4 days.
- 17% same day as first BF attempt



## Motives for nipple shield use by gestational age groups

	N*	GA 24 - 27 %	GA 28 - 31 %	GA 32 - 34 %	GA 35 - 36 %	Total** %	Linear-by- Linear Ass. p-value
<i>Used for breastfeeding problems related to the infant</i>							
Infant slipped the nipple	708	65	63	49	48	52	0.004
Infant could not open mouth high enough to latch on	708	32	30	34	27	31	0.417
Infant became frustrated at the breast	708	36	29	24	23	25	0.092
Infant fell asleep at the breast	708	23	8	15	20	16	0.056
<i>Used for breastfeeding problems related to the mother</i>							
Inverted/flat nipples	604	15	14	23	30	23	0.002
Breast too engorged	604	4	2	14	22	14	<0.0001
Sore nipples	604	12	6	11	11	10	0.381

- \*Analysis included 708 infants and 604 mothers, respectively, who reported a motive for nipple shield use



# Odds for failure of exclusive breastfeeding at discharge from NICU associated with motives for nipple shield use in preterm infants

Adjusted analysis (N = 574)

	OR (95% CI)	p-value
Infant slipped the nipple	0.73 (0.48; 1.10)	0.127
Infant could not open mouth high enough to latch on	0.71 (0.45; 1.11)	0.131
Infant became frustrated at the breast	1.20 (0.76; 1.90)	0.430
Infant fell asleep at the breast	1.90 (1.15; 3.13)	0.012
Inverted/flat nipples	0.94 (0.56; 1.56)	0.798
Breast too engorged	0.32 (0.16; 0.63)	0.001
Sore nipples	1.44 (0.77; 2.72)	0.257

- Analysed with one infant per mother. Adjusted for gestational age (<32 weeks), multiples, gender, mode of delivery, maternal breastfeeding experience (<4 months exclusive), pumping at discharge, smoking, and site of discharge (NICU).



## Breastfeeding status at discharge to home and nipple shield use during hospital stay

	Breastfeeding status		Nipple shield use within groups	
	n/N	%	n/N	%
Exclusively breastfed	961/1406	68	469/961	49
Partially breastfed	246/1406	18	170/246	69
Not breastfed	199/1406	14	125/199	63



## Nipple shield use after discharge and exclusive breastfeeding 1 month corrected age

	Excl BF 1 month
• Continued nipple shield	50%
• Discontinued nipple shield use before discharge	54%
• Never used nipple shield	58%
	(p=0.014)



## Strenghts

- Large number of participants
- Including preterm infants from GA 24 to 36
- The national multicenter design
- The level of specificity among users of nipple shields
- Defining breastfeeding as exclusive breastfeeding at and from the breast



## Limitations

- Not designed to establish cause and effect relationships.
- Many of the mother-infant dyads had more than one motive for nipple shield use and it is unclear whether mothers or staff initiated nipple shield use.
- Infants who were exposed to nipple shields may also be those who had more breastfeeding problems.
- The huge variation in nipple shield use between NICUs (35-67%) indicated that nipple shields were not always used to solve the same degree of breastfeeding problems.
- Nevertheless, a large study like this provides evidence from clinical practice that adds to results from smaller studies.



## Conclusion

- No justifiable reasons for nipple shield use, except for “breast too engorged”.
- Nipple shields should not be recommended for infants falling asleep at the breast - be patient.
- Give skilled breastfeeding support to solve breastfeeding problems and let mothers repeat attempts to breastfeed without a nipple shield.
- The use of a nipple shield does not promote exclusive breastfeeding in preterm infants. Therefore, the results of initiation time and the distribution of motives should not be used as recommendations for nipple shield use.
- Nipple shield use should be restricted and at the lowest possible rate.





## Thank you for your attention

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### RESEARCH ARTICLE

## Nipple shield use in preterm infants: Prevalence, motives for use and association with exclusive breastfeeding—Results from a national cohort study

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